APC Back-UPS® 300, 500, 650 User's Manual

990-2004E Revision 7 12/99

1 Inspect

Inspect the UPS and its contents on receipt:

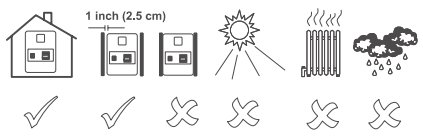
- User's Manual
- UPS
- Cord straps (2)
- Telephone cable
- Warranty card
- APC Solutions magazine
- Equipment Protection policy

500 and 650 VA models:

- PowerChute® *plus* software CD
- Interface cable
- Software Install Sheet

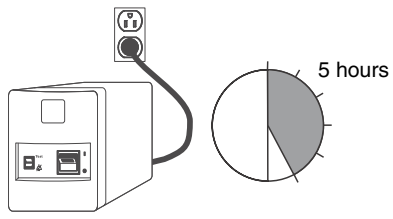
The packaging is recyclable, save it for re-use or dispose of it properly. Please fill out the warranty registration card to obtain warranty coverage.

2 Place



Locate the UPS in a protected area that is free of excessive dust and has adequate air flow. **Do not operate the UPS where the temperature and humidity is outside specifications.**

3 Connect UPS to power



Connect the battery

Refer to "Battery replacement procedure"- pg. 2

Charge the battery

The UPS battery charges whenever it is connected to utility power and typically requires less than five hours to charge fully. UPS capacity is reduced until the battery is fully charged.

4 Check site wiring fault indicator (rear panel-top)

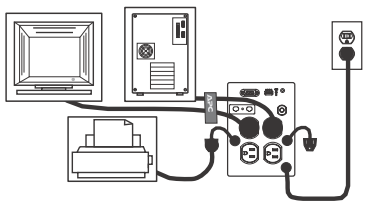
A lit indicator means that a shock hazard exists due to faulty building wiring , that should be corrected by a qualified electrician.

If the building wiring fault indicator is lit, one of the following conditions exist:

- Open or high resistance ground
- Hot and neutral polarity reversal
- Overloaded neutral circuit

Note: Improper building wiring will not prevent the UPS from operating but will limit it's protection capability. Faulty building wiring could result in equipment damage that is not covered by APC. Please refer to APC's Equipment Protection Policy for details.

5 Connect equipment



Cord Straps: Straps are provided to keep cords from tangling and taking up too much space.

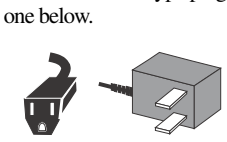
Battery Back-Up Outlets:

- Surge protection when utility power is used
- Battery power and surge protection when utility voltage is outside acceptable limits.

Data-sensitive equipment such as a computer, monitor, or external drive are connected to these outlets.

Accessory Surge Protection Outlets (500 and 650 VA models only): These outlets are for equipment that need surge protection but do not need power during a utility outage (like an inkjet printer or a scanner).

BlockSafe™ Outlets (500 and 650 VA models only): Corded sockets are provided which accept "block type" plugs without covering other outlets. Some printers and external disk drives have block type plugs that look similar to the one below.



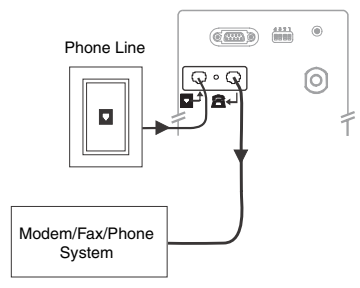
Caution: Do not connect a surge suppressor or laser printer to the UPS. These devices may overload the UPS.

6 Connect phone cables to surge protection (optional)

Socket Location:

Rear panel of 500 and 650 VA models only.

Surge protection is provided for one phone line when it is connected as shown below:



7 Switch "On" and test the UPS

Press the upper portion of the Power 1/0 switch and then switch "On" the equipment connected to the UPS. The Power 1/0 switch should be lit. Utility power is supplied to the equipment.

Perform a simulated utility blackout test to confirm the UPS unit can switch from utility power to battery power and back again, without affecting equipment powered by the UPS.

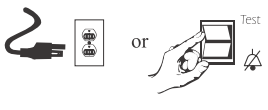
Connected equipment must be "On".

Continued

7 Continued

Start the test by either:

- Unplugging the UPS power cord, or
- Pressing and holding the "Test" portion of the Test/ Alarm Disable switch (500 and 650 VA models only).

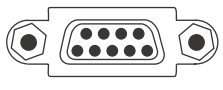


1. The UPS will then beep once every five seconds (or continuously) to remind you that your equipment is powered by a limited capacity power source.
2. Restore power to the UPS by releasing the Test switch or by reconnecting the UPS power cord.

If the equipment operation was undisturbed throughout the testing, the system is operating properly.

8 Connect computer interface cable (optional)

Socket Location:



Rear panel of UPS

Note: 300 VA model users must purchase software and cable separately. Call APC at the number listed at the bottom of Page 2, and ask for software kit AP9015.

Connect the interface cable to the computer interface port on the rear panel of the UPS. Connect the other cable end to an unused serial port socket on the computer and install the PowerChute® plus software (see software documentation for detailed instructions).

UPS Controls

Power 1/0 Switch

The Power 1/0 Switch controls power to the UPS.

Lamp: The lamp in the Power 1/0 Switch is lit whenever normal utility voltages are present at the power sockets.

1 The UPS operates and all connected devices are powered.

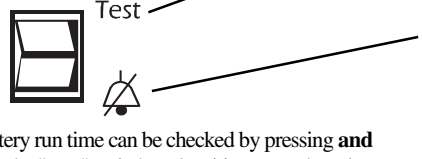
0 The UPS is de-energized and all devices connected to battery backup outlets are unpowered

All devices connected to **battery back-up outlets** can be switched "On" or "Off" using this switch, if each device's power switch is left in the "On" position.

Note: Accessory surge protected outlets are unaffected by this switch - they remain powered as long as utility power is available.

Test/Alarm Disable Switch

Switch Location: Front panel of 500 and 650 VA models only.



The battery run time can be checked by pressing **and holding** the "Test" switch and waiting to see how long the UPS provides power to the equipment before the low battery warning is sounded.

Test

Press the "Test" portion of the Test/Alarm Disable Switch to simulate a power outage - the UPS battery supplies power to the equipment

Alarm Disable

The UPS will emit a beep once every five seconds during a utility power outage, unless the alarm is disabled by pressing this side of the switch. The UPS low battery warning (a loud continuous tone) will still sound in the event of an extended utility outage.

Specifications

Acceptable Input Voltage	0 - 150 V ac, Single Phase
Transfer Voltage	103 V ac (may be set lower)
Output Voltage	109-121 V ac
Input Over Current Protection	Resettable circuit breaker
Frequency Limits (on line)	57 - 63 Hz (autosensing)
Transfer Time (blackout response time)	8 ms
Maximum Load	**300 VA** - 180 W **500 VA** - 330 W **650 VA** - 400 W
On-battery Output Voltage	115 V ac
On-battery Frequency	58-62 Hz unless synchronized to utility during brownout
On-battery Waveshape	Stepped sine-wave
Output Over Current Protection	Overcurrent and short-circuit protected, latching shutdown on overload
Battery Type	Spill proof, maintenance free, sealed lead-acid
Typical Battery Life	3 to 6 years, depending on number of discharge cycles and ambient temperature
Typical Recharge Time	5 to 10 hours from total discharge
Operating Temperature	32 to 104° F (0 to 40° C)
Storage Temperature	5 to 113° F (-15 to 45° C)
Operating and Storage Relative Humidity	0 to 95%, non-condensing
Operating Elevation	0 to +10,000 ft (0 to +3,000 m)
Storage Elevation	0 to +50,000 ft (0 to +15,000 m)
Audible Noise at 3 ft (1 m)	<40 dBA
Size (H x W x D)	**300 VA, 500 VA**: 6.0" x 3.4" x 13.1" (15.1 x 8.6 x 33.3 cm) **650 VA:** 6.6" x 4.7" x 14.2" (16.8 x 11.9 x 36.1 cm)
Weight	**300 VA** 13.1 lb (6.0 kg) **500 VA** 15.4 lb (7.0 kg) **650 VA** 23.0 lb (10.5 kg)
Shipping Weight	**300 VA** 15.7 lb (7.1 kg) **500 VA** 18.0 lb (8.2 kg) **650 VA** 26.5 lb (12.0 kg)
Listing and Certifications	UL 1778, CSA 107.1, FCC part 15 and part 68
EMI Verification	FCC Class B certified
Electromagnetic Immunity	IEC 801-2, 801-3, 801-4 level IV, and 801-5 level III

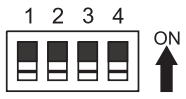
RunTime (minutes) vs. Power Demand

System Description	Demand (Watts)	Back-UPS 300	Back-UPS 500	Back-UPS 650
Desktop 486 w/14" or 15" Monitor	105	16	22	37
Desktop/Mini Tower Pentium w/14 or 15" Monitor	110	14	20	34
Desktop/Mini Tower Pentium w/17" Monitor	130	10	17	26
Desktop/Mini Tower Pentium II/Pentium Pro w/14 or 15" Monitor	130	10	17	26
Tower Pentium II/Pentium Pro w/14" or 15" Monitor	150	8	14	21
Tower Pentium w/17" Monitor	150	8	14	21
Desktop/Mini Tower Pentium II/Pentium Pro w/17" Monitor	150	8	14	21
Desktop/Mini Tower Pentium w/21" Monitor	170	6	12	17
Tower Pentium II/Pentium Pro w/17" Monitor	170	6	12	17
Desktop/Minitower K6 w/21" Monitor	180	6	10	15
Tower Pentium w/21" Monitor	190	-	9	14
Desktop/Mini Tower Pentium II/Pentium Pro w/21" Monitor	190	-	9	14
Tower Pentium II/Pentium Pro w/21" Monitor	210	-	7	11

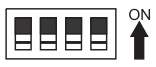
Note: These values are approximate. Battery age, excessive use, and elevated operating temperature may further decrease UPS runtime. More information can be found at http://www.apc.com/sizing.

Option Switches

A set of 4 switches, located on the rear panel, can be used to change how the UPS operates. For typical applications, all switches are in the down position as shown below.



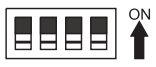
Switch 1

Switch Position	Result
	**Normal Setting**: The UPS beeps once every five seconds when the utility voltage has fallen outside acceptable limits.
	If switch #1 is set to the "On" position, the UPS audible utility failure alarm is defeated. This feature is convenient when brief power interruptions are common and the alarm becomes annoying.

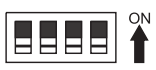
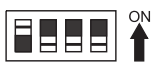
Regardless of the position of switch 1, the UPS will sound a loud continuous tone during low battery conditions.

Switches #2 and #3

Switches #2 and #3 set the utility voltage value (transfer voltage) at which the UPS will switch to battery power. If you know that your equipment will operate properly at any of the voltages less than 103 V shown in the table, you can change to the corresponding switch positions. Changing the transfer voltage is desirable when frequent line voltage excursions or line voltage distortion cause the UPS to use battery power too often.

Switch Position	Transfer Voltage
	103 V AC **Normal Setting**
	98 V AC
	93 V AC
	88 V AC

Switch #4 (500 and 650 VA models only)

Switch Position	Result
	**Normal Setting:** Two minutes prior to shut down during an extended power outage, the UPS will sound the low battery warning and activate the low battery signal at the computer interface port.
	Same behavior as "Normal" except the warning is issued five minutes before shutdown. Use this setting if you require more than two minutes to save files and close operations.

Troubleshooting

Use the table below to solve minor UPS installation problems. Consult the APC web site or contact APC Technical Support Staff for assistance with complex UPS problems.

Possible Cause	Procedure
UPS beeps about every five seconds	
Utility power outage.	None. The UPS is protecting your equipment. Be prepared to properly exit applications and the operating system, and then power "Off" the system before the UPS is seriously discharged.
UPS beeps occasionally	
Temporary utility outage or disturbance.	None. The UPS is protecting your equipment.
UPS operates on-battery although normal utility voltage exists	
UPS input circuit breaker "tripped".	Reduce equipment power demand by unplugging equipment from the UPS. Reset the circuit breaker (on back of UPS) by pressing plunger back in.
A brownout has occurred.	The transfer voltage can be lowered by changing option switches 2 and 3 (see previous section). Note: If you decide to lower the transfer voltage make sure all devices connected to battery back up outlets will operate properly at this lower utility voltage.
UPS will not turn "On"	
UPS is not connected to AC power supply.	Check that the power cable from the UPS to the power supply is securely connected.
UPS circuit breaker "tripped".	Reduce the power demand on the UPS by unplugging equipment and reset the circuit breaker.
Very low or no utility voltage.	Check the AC power supply to the UPS with a table lamp. If the lamp is very dim, have the utility voltage checked.
Battery is not connected properly.	Check the battery connections. Consult the Battery Replacement Procedure that shows how to access the battery.
UPS does not provide expected backup time	
The UPS is overloaded.	Unplug non-essential equipment, such as printers.
The UPS battery is weak due to recent outage or is near the end of its service life.	Charge the battery. Battery capacity decreases with frequent (or long) power outages or when operated at elevated temperatures. If the battery is near the end of its service life, consider replacing the battery.

Warranty

Customers may return their defective unit to APC for replacement or repair during the standard 2 year warranty period. APC's standard procedure will be to replace the original unit with a factory-reconditioned unit. Customers who must have the original unit back due to assigned asset tags and set depreciation schedules must declare such a need at first contact with APC Customer Service. APC will ship out the replacement unit once the defective unit has been received by the repair department. The customer pays for the shipping to APC, APC covers ground freight transportation costs back to the customer.

Order replacement battery

The table below shows the APC part numbers for APC Back-UPS replacement battery cartridges (RBCs). Replacements can be ordered from local retailers, APC, or the APC website at http://www.apc.com.

300 and 500 VA models	RBC2
650 VA model	RBC3

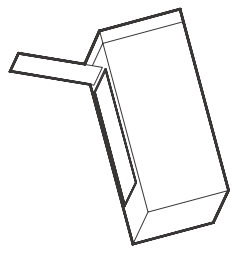
Battery replacement procedure

This procedure requires a coin or screwdriver.

Note: Please read the cautions in the APC Safety Information Guide first!

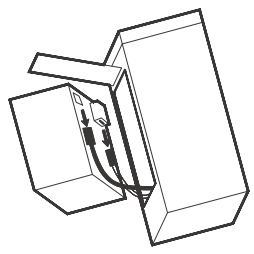
Battery replacement is a safe procedure, isolated from electrical hazards. You may leave the UPS connected to utility power and your equipment connected and "On" during this procedure.

Note: Once the battery is disconnected, the loads are not protected from power outages.

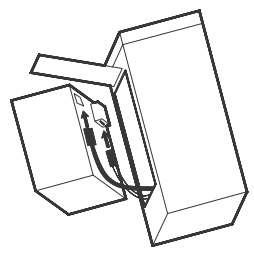


1. Lay the UPS on its left side. Remove the two screws holding on the battery door and open the door.

> **Note:** It may be necessary to pull the battery door slightly outward or toward the front of the unit in order to open the door fully.



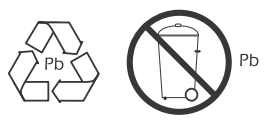
2. Grasp the white tab attached to the battery and gently pull the battery out.
3. Disconnect the two wires connecting the battery to the UPS. Loosen the wires by wiggling them while pulling straight back from the battery connector.



4. Connect the new battery in place of the old.

> **Note:** Small sparks at the battery connections are normal during connection.

5. Insert the new battery in the UPS. Carefully avoid pinching the wires.
6. Close the battery compartment door and replace the screws.



7. Spent batteries must be recycled. Deliver the battery to an appropriate recycling facility or ship it to the supplier in the new battery's packing material. See the new battery instructions for more information.

Storage

Before storing, charge the UPS for at least 10 hours. Store the UPS covered and upright in a cool, dry location.

Long term storage

Storage Temperature	Recharge Frequency	Charging Duration
5 to 86oF (-15 to 30 o C)	Every 6 Months	10 Hours
86 to 113oF (30 to 45o C)	Every 3 Months	10 Hours

Service

Note: If the UPS requires service, do not return it to the dealer! The following steps should be taken.

1. Consult the Troubleshooting section to eliminate common problems.
2. Verify that no circuit breakers are tripped. A tripped circuit breaker is the most common UPS problem!
3. If the problem persists, consult the APC Worldwide Web site (www.apc.com) or call customer service.
   - Record the model number of the UPS, the serial number, and the date purchased. Be prepared to troubleshoot the problem over the telephone with a technician If this is not successful, the technician will issue a Return Merchandise Authorization Number (RMA#) and a shipping address.
   - If the UPS is under warranty, repairs are free. If not, there is a repair charge.
4. Pack the UPS in its original packaging. If the original packing is not available, ask customer service about obtaining a new set. Pack the UPS properly to avoid damage in transit.

   Note: Never use Styrofoam™ beads for packaging. Damage sustained in transit is not covered under warranty (insuring the package for full value is recommended).
5. Write the RMA# on the outside of the package.
6. Return the UPS by insured, prepaid carrier to the address **given to you by customer service**.

APC contact information

USA/Canada …….....……	1-800-800-4272
Mexico …….....……	292-0253, 292-0255
Brazil …….....……	0800-12-72-1
Worldwide …….....……	1-401-789-5735
Internet	http://www.apc.com
E-Mail	apctech@apc.com